SEQUENCE LISTING

<110> Fitzmaurice, Wayne P
       Pogue, Gregory P
       Lindbo, John A

<120> VIRAL EXPRESSION VECTORS

<130> 60-016511US

<140> US 10/624,193
<141> 2003-07-21

<160> 6

<170> PatentIn version 3.1

<210> 1
<211> 7685
<212> DNA
<213> Nicotiana tabacum

<400> 1
```
gtatttttac aacaattacc aacaacaaca aacaacagac aacattacaa ttactatttta    60

caattacaat ggcatacaca cagacagcta ccacatcagc tttgctggac actgtccgag   120

gaaacaactc cttggtcaat gatctagcaa agcgtcgtct ttacgacaca gcggttgaag   180

agtttaacgc tcgtgaccgc aggcccaagg tgaacttttc aaaagtaata agcgaggagc   240

agacgcttat tgctacccgg gcgtatccag aattccaaat tacattttat aacacgcaaa   300

atgccgtgca ttcgcttgca ggtggattgc gatctttaga actggaatat ctgatgatgc   360

aaattcccta cggatcattg acttatgaca taggcgggaa ttttgcatcg catctgttca   420

agggacgagc atatgtacac tgctgcatgc ccaacctgga cgttcgagac atcatgcggc   480

acgaaggcca gaaagacagt attgaactat acctttctag gctagagaga ggggggaaaa   540

cagtccccaa cttccaaaag gaagcatttg acagatacgc agaaattcct gaagacgctg   600

tctgtcacaa tactttccag acatgcgaac atcagccgat gcagcaatca ggcagagtgt   660

atgccattgc gctacacagc atatatgaca taccagccga tgagttcggg gcggcactct   720

tgaggaaaaa tgtccatacg tgctatgccg ctttccactt ctccgagaac ctgcttcttg   780

aagattcatg cgtcaatttg gacgaaatca cgcgtgttt ttcgcgcgat ggagacaagt   840

tgacctttc ttttgcatca gagagtactc ttaattactg tcatagttat tctaatattc   900

ttaagtatgt gtgcaaaact tacttcccgg cctctaatag agaggtttac atgaaggagt   960

ttttagtcac cagagttaat acctggtttt gtaagttttc tagaatagat acttttcttt  1020

tgtacaaagg tgtggcccat aaaagtgtag atagtgagca gtttttatact gcaatggaag  1080

acgcatggca ttacaaaaag actcttgcaa tgtgcaacag cgagagaatc ctccttgagg  1140

attcatcatc agtcaattac tggtttccca aaatgaggga tatggtcatc gtaccattat  1200
```

```
tcgacatttc tttggagact agtaagagga cgcgcaagga agtcttagtg tccaaggatt    1260

tcgtgtttac agtgcttaac cacattcgaa cataccaggc gaaagctctt acatacgcaa    1320

atgttttgtc cttcgtcgaa tcgattcgat cgagggtaat cattaacggt gtgacagcga    1380

ggtccgaatg ggatgtggac aaatctttgt tacaatcctt gtccatgacg ttttacctgc    1440

atactaagct tgccgttcta aaggatgact tactgattag caagtttagt ctcggttcga    1500

aaacggtgtg ccagcatgtg tgggatgaga tttcgctggc gtttgggaac gcatttccct    1560

ccgtgaaaga gaggctcttg aacaggaaac ttatcagagt ggcaggcgac gcattagaga    1620

tcagggtgcc tgatctatat gtgaccttcc acgacagatt agtgactgag tacaaggcct    1680

ctgtggacat gcctgcgctt gacattagga agaagatgga agaaacggaa gtgatgtaca    1740

atgcactttc agaattatcg gtgttaaggg agtctgacaa attcgatgtt gatgtttttt    1800

cccagatgtg ccaatctttg gaagttgacc caatgacggc agcgaaggtt atagtcgcgg    1860

tcatgagcaa tgagagcggt ctgactctca catttgaacg acctactgag gcgaatgttg    1920

cgctagcttt acaggatcaa gagaaggctt cagaaggtgc attggtagtt acctcaagag    1980

aagttgaaga accgtccatg aagggttcga tggccagagg agagttacaa ttagctggtc    2040

ttgctggaga tcatccggaa tcgtcctatt ctaagaacga ggagatagag tctttagagc    2100

agtttcatat ggcgacggca gattcgttaa ttcgtaagca gatgagctcg attgtgtaca    2160

cgggtccgat taaagttcag caaatgaaaa actttatcga tagcctggta gcatcactat    2220

ctgctgcggt gtcgaatctc gtcaagatcc tcaaagatac agctgctatt gaccttgaaa    2280

cccgtcaaaa gtttggagtc ttggatgttg catctaggaa gtggttaatc aaaccaacgg    2340

ccaagagtca tgcatggggt gttgttgaaa cccacgcgag gaagtatcat gtggcgcttt    2400

tggaatatga tgagcagggt gtggtgacat gcgatgattg gagaagagta gctgttagct    2460

ctgagtctgt tgtttattcc gacatggcga aactcagaac tctgcgcaga ctgcttcgaa    2520

acggagaacc gcatgtcagt agcgcaaagg ttgttcttgt ggacggagtt ccgggctgtg    2580

gaaaaaccaa agaaattctt tccagggtta attttgatga agatctaatt ttagtacctg    2640

ggaagcaagc cgcggaaatg atcagaagac gtgcgaattc ctcagggatt attgtggcca    2700

cgaaggacaa cgttaaaacc gttgattctt tcatgatgaa ttttgggaaa agcacacgct    2760

gtcagttcaa gaggttattc attgatgaag ggttgatgtt gcatactggt tgtgttaatt    2820

ttcttgtggc gatgtcattg tgcgaaattg catatgttta cggagacaca cagcagattc    2880

catacatcaa tagagtttca ggattcccgt accccgccca ttttgccaaa ttggaagttg    2940

acgaggtgga gacacgcaga actactctcc gttgtccagc cgatgtcaca cattatctga    3000

acaggagata tgagggcttt gtcatgagca cttcttcggt taaaaagtct gtttcgcagg    3060

agatggtcgg cggagccgcc gtgatcaatc cgatctcaaa acccttgcat ggcaagatct    3120
```

```
tgactttttac ccaatcggat aaagaagctc tgctttcaag agggtattca gatgttcaca    3180

ctgtgcatga agtgcaaggc gagacatact ctgatgtttc actagttagg ttaaccccta    3240

caccggtctc catcattgca ggagacagcc cacatgtttt ggtcgcattg tcaaggcaca    3300

cctgttcgct caagtactac actgttgtta tggatccttt agttagtatc attagagatc    3360

tagagaaact tagctcgtac ttgttagata tgtataaggt cgatgcagga acacaatagc    3420

aattacagat tgactcggtg ttcaaaggtt ccaatctttt tgttgcagcg ccaaagactg    3480

gtgatatttc tgatatgcag ttttactatg ataagtgtct cccaggcaac agcaccatga    3540

tgaataattt tgatgctgtt accatgaggt tgactgacat ttcattgaat gtcaaagatt    3600

gcatattgga tatgtctaag tctgttgctg cgcctaagga tcaaatcaaa ccactaatac    3660

ctatggtacg aacggcggca gaaatgccac gccagactgg actattggaa aatttagtgg    3720

cgatgattaa aagaaacttt aacgcacccg agttgtctgg catcattgat attgaaaata    3780

ctgcatcttt ggttgtagat aagttttttg atagttattt gcttaaagaa aaaagaaaac    3840

caaataaaaa tgtttctttg ttcagtagag agtctctcaa tagatggtta gaaaagcagg    3900

aacaggtaac aataggccag ctcgcagatt ttgattttgt ggatttgcca gcagttgatc    3960

agtacagaca catgattaaa gcacaaccca aacaaaagtt ggacacttca atccaaacgg    4020

agtacccggc tttgcagacg attgtgtacc attcaaaaaa gatcaatgca atattcggcc    4080

cgttgtttag tgagcttact aggcaattac tggacagtgt tgattcgagc agattttttgt    4140

ttttcacaag aaagacacca gcgcagattg aggatttctt cggagatctc gacagtcatg    4200

tgccgatgga tgtcttggag ctggatatat caaaatacga caaatctcag aatgaattcc    4260

actgtgcagt agaatacgag atctggcgaa gattgggttt cgaagacttc ttgggagaag    4320

tttggaaaca agggcataga aagaccaccc tcaaggatta taccgcaggt ataaaaactt    4380

gcatctggta tcaaagaaag agcggggacg tcacgacgtt cattggaaac actgtgatca    4440

ttgctgcatg tttggcctcg atgcttccga tggagaaaat aatcaaagga gccttttgcg    4500

gtgacgatag tctgctgtac tttccaaagg gttgtgagtt ccggatgtgt caacactccg    4560

cgaatcttat gtggaatttt gaagcaaaac tgtttaaaaa acagtatgga tacttttgcg    4620

gaagatatgt aatacatcac gacagaggat gcattgtgta ttacgatccc ctaaagttga    4680

tctcgaaact tggtgctaaa cacatcaagg attgggaaca cttggaggag ttcagaaggt    4740

ctctttgtga tgttgctgtt tcgttgaaca attgtgcgta ttacacacag ttggacgacg    4800

ctgtatggga ggttcataag accgcccctc caggttcgtt tgtttataaa agtctggtga    4860

agtatttgtc tgataaagtt cttttttagaa gtttgtttat agatggctct agttgttaaa    4920

ggaaaagtga atatcaatga gtttatcgac ctgacaaaaa tggagaagat cttaccgtcg    4980
```

```
atgtttaccc ctgtaaagag tgttatgtgt tccaaagttg ataaaataat ggttcatgag   5040

aatgagtcat tgtcaggggt gaaccttctt aaaggagtta agcttattga tagtggatac   5100

gtctgtttag ccggtttggt cgtcacgggc gagtggaact tgcctgacaa ttgcagagga   5160

ggtgtgagcg tgtgtctggt ggacaaaagg atggaaagag ccgacgaggc cactctcgga   5220

tcttactaca cagcagctgc aaagaaaaga tttcagttca aggtcgttcc caattatgct   5280

ataaccaccc aggacgcgat gaaaaacgtc tggcaagttt tagttaatat tagaaatgtg   5340

aagatgtcag cgggtttctg tccgctttct ctggagtttg tgtcggtgtg tattgtttat   5400

agaaataata taaaattagg tttgagagag aagattacaa acgtgagaga cggagggccc   5460

atggaactta cagaagaagt cgttgatgag ttcatggaag atgtccctat gtcgatcagg   5520

cttgcaaagt ttcgatctcg aaccggaaaa aagagtgatg tccgcaaagg gaaaaatagt   5580

agtagtgatc ggtcagtgcc gaacaagaac tatagaaatg ttaaggattt tggaggaatg   5640

agttttaaaa agaataattt aatcgatgat gattcggagg ctactgtcgc cgaatcggat   5700

tcgttttaaa tagatcttac agtatcacta ctccatctca gttcgtgttc ttgtcattaa   5760

ttaaatggct agcaaaggag aagaactttt cactggagtt gtcccaattc ttgttgaatt   5820

agatggtgat gttaatgggc acaaattttc tgtcagtgga gagggtgaag gtgatgctac   5880

atacggaaag cttaccctta aatttatttg cactactgga aaactacctg ttccatggcc   5940

aacacttgtc actactttct cttatggtgt tcaatgcttt tcccgttatc cggatcatat   6000

gaaacggcat gactttttca gagtgccat gcccgaaggt tatgtacagg aacgcactat   6060

atctttcaaa gatgacggga actacaagac gcgtgctgaa gtcaagtttg aaggtgatac   6120

ccttgttaat cgtatcgagt taaaaggtat tgattttaaa gaagatggaa acattctcgg   6180

acacaaactc gagtacaact ataactcaca caatgtatac atcacggcag acaaacaaaa   6240

gaatggaatc aaagctaact tcaaaattcg ccacaacatt gaagatggat ccgttcaact   6300

agcagaccat tatcaacaaa atactccaat tggcgatggc cctgtccttt taccagacaa   6360

ccattacctg tcgacacaat ctgccctttc gaaagatccc aacgaaaagc gtgaccacat   6420

gggccttctt gagtttgtaa ctgctgctgg gattacacat ggcatggatg agctctacaa   6480

ataatgacac tcgaggggta gtcaagatgc ataataaata acggattgtg tccgtaatca   6540

cacgtggtgc gtacgataac gcatagtgtt tttccctcca cttaaatcga agggttgtgt   6600

cttggatcgc gcgggtcaaa tgtatatggt tcatatacat ccgcaggcac gtaataaagc   6660

gaggggttcg ggtcgaggtc ggctgtgaaa ctcgaaaagg ttccggaaaa caaaaaagag   6720

agtggtaggt aatagtgtta ataataagaa aataaataat agtggtaaga aaggtttgaa   6780

agttgaggaa attgaggata atgtaagtga tgacgagtct atcgcgtcat cgagtacgtt   6840

ttaatcaata tgccttatac aatcaactct ccgagccaat ttgtttactt aagttccgct   6900
```

```
tatgcagatc ctgtgcagct gatcaatctg tgtacaaatg cattgggtaa ccagtttcaa      6960

acgcaacaag ctaggacaac agtccaacag caatttgcgg atgcctggaa acctgtgcct      7020

agtatgacag tgagatttcc tgcatcggat ttctatgtgt atagatataa ttcgacgctt      7080

gatccgttga tcacggcgtt attaaatagc ttcgatacta gaaatagaat aatagaggtt      7140

gataatcaac ccgcaccgaa tactactgaa atcgttaacg cgactcagag ggtagacgat      7200

gcgactgtag ctataagggc ttcaatcaat aatttggcta atgaactggt tcgtggaact      7260

ggcatgttca atcaagcaag ctttgagact gctagtggac ttgtctggac cacaactccg      7320

gctacttagc tattgttgtg agatttccta aaataaagtc actgaagact taaaattcag      7380

ggtggctgat accaaaatca gcagtggttg ttcgtccact aaatataac gattgtcata      7440

tctggatcca acagttaaac catgtgatgg tgtatactgt ggtatggcgt aaaacaacgg      7500

aaaagtcgct gaagacttaa aattcagggt ggctgatacc aaaatcagca gtggttgttc      7560

gtccacttaa aaataacgat tgtcatatct ggatccaaca gttaaaccat gtgatggtgt      7620

atactgtggt atggcgtaaa caacggagag gttcgaatcc tcccctaacc gcgggtagcg      7680

gccca                                                                  7685


<210> 2
<211> 7686
<212> DNA
<213> Nicotiana tabacum

<400> 2
gtatttttac aacaattacc aacaacaaca aacaacagac aacattacaa ttactattta       60

caattacaat ggcatacaca cagacagcta ccacatcagc tttgctggac actgtccgag      120

gaaacaactc cttggtcaat gatctagcaa agcgtcgtct ttacgacaca gcggttgaag      180

agtttaacgc tcgtgaccgc aggcccaagg tgaacttttc aaaagtaata agcgaggagc      240

agacgcttat tgctacccgg gcgtatccag aattccaaat tacatttttat aacacgcaaa      300

atgccgtgca ttcgcttgca ggtggattgc gatctttaga actggaatat ctgatgatgc      360

aaattcccta cggatcattg acttatgaca taggcgggaa ttttgcatcg catctgttca      420

agggacgagc atatgtacac tgctgcatgc ccaacctgga cgttcgagac atcatgcggc      480

acgaaggcca gaaagacagt attgaactat acctttctag gctagagaga gggggggaaaa      540

cagtccccaa cttccaaaag gaagcatttg acagatacgc agaaattcct gaagacgctg      600

tctgtcacaa tactttccag acatgcgaac atcagccgat gcagcaatca ggcagagtgt      660

atgccattgc gctacacagc atatatgaca taccagccga tgagttcggg gcggcactct      720

tgaggaaaaa tgtccatacg tgctatgccg ctttccactt ctccgagaac ctgcttcttg      780

aagattcatg cgtcaatttg gacgaaatca cgcgtgtttt ttcgcgcgat ggagacaagt      840
```

```
tgaccttttc ttttgcatca gagagtactc ttaattactg tcatagttat tctaatattc    900

ttaagtatgt gtgcaaaact tacttcccgg cctctaatag agaggtttac atgaaggagt    960

ttttagtcac cagagttaat acctggtttt gtaagttttc tagaatagat acttttcttt   1020

tgtacaaagg tgtggcccat aaaagtgtag atagtgagca gttttatact gcaatggaag   1080

acgcatggca ttacaaaaag actcttgcaa tgtgcaacag cgagagaatc ctccttgggg   1140

attcatcatc agtcaattac tggtttccca aaatgaggga tatggtcatc gtaccattat   1200

tcgacatttc tttggagact agtaagagga cgcgcaagga agtcttagtg tccaaggatt   1260

tcgtgttcac agtgcttaac cacattcgaa cataccaggc gaaagctctt acatacgcaa   1320

atgttttgtc cttcgtcgaa tcgattcgat cgagggtaat cattaacggt gtgacagcga   1380

ggtccgaatg ggatgtggac aaatctttgt tacaatcctt gtccatgacg ttttacctgc   1440

atactaagct tgccgttcta aaggatgact tactgattag caagtttagt ctcggttcga   1500

aaacggtgtg ccagcatgtg tgggatgaga tttcgctggc gtttgggaac gcatttccct   1560

ccgtgaaaga gaggctcttg aacaggaaac ttatcagagt ggcaggcgac gcattagaga   1620

tcagggtgcc tgatctatat gtgaccttcc acgacagatt agtgactgag tacaaggcct   1680

ctgtggacat gcctgcgctt gacattagga agaagatgga agaaacggaa gtgatgtaca   1740

atgcactttc agaattatcg gtgttaaggg agtctgacaa attcgatgtt gatgtttttt   1800

cccagatgtg ccaatctttg gaagttgacc caatgacggc agcgaaggtt atagtcgcgg   1860

tcatgagcaa tgagagcggt ctgactctca catttgaacg acctactgag gcgaatgttg   1920

cgctagcttt acaggatcaa gagaaggctt cagaaggtgc attggtagtt acctcaagag   1980

aagttgaaga accgtccatg aagggttcga tggccagagg agagttacaa ttagctggtc   2040

ttgctggaga tcatccggaa tcgtcctatt ctaagaacga ggagatagag tctttagagc   2100

agtttcatat ggcgacggca gattcgttaa ttcgtaagca gatgagctcg attgtgtaca   2160

cgggtccgat taaagttcag caaatgaaaa actttatcga tagcctggta gcatcactat   2220

ctgctgcggt gtcgaatctc gtcaagatcc tcaaagatac agctgctatt gaccttgaaa   2280

cccgtcaaaa gtttggagtc ttggatgttg catctaggaa gtggttaatc aaaccaacgg   2340

ccaagagtca tgcatggggt gttgttgaaa cccacgcgag ggagtatcat gtggcgcttt   2400

tggaatatga tgagcagggt gtggtgacat gcgatgattg gagaagagta gctgttagct   2460

ctgagtctgt tgtttattcc gacatggcga aactcagaac tctgcgcaga ctgcttcgaa   2520

acggagaacc gcatgtcagt agcgcaaagg ttgttcttgt ggacggagtt ccgggctgtg   2580

gaaaaaccaa agaaattctt tccagggtta attttgatga agatctaatt ttagtacctg   2640

ggaagcaagc cgcggaaatg atcagaagac gtgcgaattc ctcagggatt attgtggcca   2700
```

```
cgaaggacaa cgttaaaacc gttgattctt tcatgatgaa ttttgggaaa agcacacgct    2760

gtcagttcaa gaggttattc attgatgaag ggttgatgtt gcatactggt tgtgttaatt    2820

ttcttgtggc gatgtcattg tgcgaaattg catatgttta cggagacaca cagcagattc    2880

catacatcaa tagagtttca ggattcccgt accccgccca ttttgccaaa ttggaagttg    2940

acgaggtgga gacacgcaga actactctcc gttgtccagc cgatgtcaca cattatctga    3000

acaggagata tgagggcttt gtcatgagca cttcttcggt taaaaagtct gtttcgcagg    3060

agatggtcgg cggagccgcc gtgatcaatc cgatctcaaa acccttgcat ggcaagatcc    3120

tgacttttac ccaatcggat aaagaagctc tgctttcaag agggtattca gatgttcaca    3180

ctgtgcatga agtgcaaggc gagacatact ctgatgtttc actagttagg ttaacccta    3240

caccggtctc catcattgca ggagacagcc cacatgtttt ggtcgcattg tcaaggcaca    3300

cctgttcgct caagtactac actgttgtta tggatccttt agttagtatc attagagatc    3360

tagagaaact tagctcgtac ttgttagata tgtataaggt cgatgcagga acacaatagc    3420

aattacagat tgactcggtg ttcaaaggtt ccaatctttt tgttgcagcg ccaaagactg    3480

gtgatatttc tgatatgcag ttttactatg ataagtgtct cccaggcaac agcaccatga    3540

tgaataattt tgatgctgtt accatgaggt tgactgacat ttcattgaat gtcaaagatt    3600

gcatattgga tatgtctaag tctgttgctg cacctaagga tcaaatcaaa ccactaatac    3660

ctatggtacg aacggcggca gaaatgccac gccagactgg actattggaa aatttagtgg    3720

cgatgattaa aagaaacttt aacgcacccg agttgtctgg catcattgat attgaaaata    3780

ctgcatcttt ggttgtagat aagtttttg atagttattt gcttaaagaa aaaagaaaac    3840

caaataaaaa tgtttctttg ttcagtagag agtctctcaa tagatggtta gaaaagcagg    3900

aacaggtaac aataggccag ctcgcagatt ttgattttgt ggatttgcca gcagttgatc    3960

agtacagaca catgattaaa gcacaaccca aacaaaagtt ggacacttca atccaaacgg    4020

agtacccggc tttgcagacg attgtgtacc attcaaaaaa gatcaatgca atattcggcc    4080

cgttgtttag tgagcttact aggcaattac tggacagtgt tgattcgagc agattttgt    4140

ttttcacaag aaagacacca gcgcagattg aggatttctt cggagatctc gacagtcatg    4200

tgccgatgga tgtcttggag ctggatatat caaaatacga caaatctcag aatgaattcc    4260

actgtgcagt agaatacgag atctggcgaa gattgggttt cgaagacttc ttgggagaag    4320

tttggaaaca agggcataga aagaccaccc tcaaggatta taccgcaggt ataaaaactt    4380

gcatctggta tcaaagaaag agcggggacg tcacgacgtt cattggaaac actgtgatca    4440

ttgctgcatg tttggcctcg atgcttccga tggagaaaat aatcaaagga gcctttgcg    4500

gtgacgatag tctgctgtac tttccaaagg gttgtgagtt ccggatgtg caacactccg    4560

cgaatcttat gtggaatttt gaagcaaaac tgtttaaaaa acagtatgga tacttttgcg    4620
```

```
gaagatatgt aatacatcac gacagaggat gcattgtgta ttacgatccc ctaaagttga    4680

tctcgaaact tggtgctaaa cacatcaagg attgggaaca cttggaggag ttcagaaggt    4740

ctctttgtga tgttgctgtt cgttgaaca  attgtgcgta ttacacacag ttggacgacg    4800

ctgtatggga ggttcataag accgcccctc caggttcgtt tgtttataaa agtctggtga    4860

agtatttgtc tgataaagtt cttttttagaa gtttgtttat agatggctct agttgttaaa    4920

ggaaaagtga atatcaatga gtttatcgac ctgacaaaaa tggagaagat cttaccgtcg    4980

atgtttaccc ctgtaaagag tgttatgtgt tccaaagttg ataaataat  ggttcatgag    5040

aatgagtcat tgtcaggggt gaaccttctt aaaggagtta agcttattga tagtggatac    5100

gtctgtttag ccggtttggt cgtcacgggc gagtggaact tgcctgacaa ttgcagagga    5160

ggtgtgagcg tgtgtctggt ggacaaaagg atggaaagag ccgacgaggc cattctcgga    5220

tcttactaca cagcagctgc aaagaaaaga tttcagttca aggtcgttcc caattatgct    5280

ataaccaccc aggacgcgat gagaaacgtc tggcaagttt tagttaatat tagaaatgtg    5340

aagatgtcag cgggtttctg tccgctttct ctggagtttg tgtcggtgtg tattgtttat    5400

agaaataata taaaattagg tttgagagag aagattacaa acgtgagaga cggagggccc    5460

atggaactta cagaagaagt cgttgatgag ttcatggaag atgtccctat gtcgatcagg    5520

cttgcaaagt ttcgatctcg aaccggaaaa aagagtgatg tccgcaaagg gaaaaatagt    5580

agtagtgatc ggtcagtgcc gaacaagaac tatagaaatg ttaaggattt tggaggaatg    5640

agttttaaaa agaataattt aatcgatgat gattcggagg ctactgtcgc cgaatcggat    5700

tcgttttaaa tagatcttac agtatcacta ctccatctca gttcgtgttc ttgtcattaa    5760

ttaaatggct agcaaaggag aagaactttt cactggagtt gtcccaattc ttgttgaatt    5820

agatggtgat gttaatgggc acaaattttc tgtcagtgga gagggtgaag gtgatgctac    5880

atacggaaag cttacactta aatttatttg cactactgga aaactacctg ttccatggcc    5940

aacacttgtc actactttct cttatggtgt tcaatgcttt tcccgttatc cggatcatat    6000

gaaacggcat gactttttca agagtgccat gcccgaaggt tatgtacagg aacgcactat    6060

atctttcaaa gatgacggga actacaagac gcgtgctgaa gtcaagtttg aaggtgatac    6120

ccttgttaat cgtatcgagt taaaaggtat tgattttaaa gaagatggaa acattctcgg    6180

acacaaactc gagtacaact ataactcaca caatgtatac atcacggcag acaaacaaaa    6240

gaatggaatc aaagctaact tcaaaattcg ccacaacatt gaagatggat ccgttcaact    6300

agcagaccat tatcaacaaa atactccaat tggcgatggc cctgtccttt taccagacaa    6360

ccattacctg tcgacacaat ctgccctttc gaaagatccc aacgaaaagc gtgaccacat    6420

ggtccttctt gagtttgtaa ctgctgctgg gattacacat ggcatggatg agctctacaa    6480
```

```
ataatgacac tcgagggggta gtcaagatgc ataataaata acggattgtg tccgtaatca    6540

cacgtggtgc gtacgataac gcatagtgtt tttccctcca cttaaatcga agggttgtgt    6600

cttggatcgc gcgggtcaaa tgtatatggt tcatatacat ccgcaggcac gtaataaagc    6660

gagggggttcg ggtcgaggtc ggctgtgaaa ctcgaaaagg ttccggaaaa caaaaaagag    6720

agtggtaggt aatagtgtta ataataagaa aataaataat agtggtaaga aaggtttgaa    6780

agttgaggaa attgaggata atgtaagtga tgacgagtct atcgcgtcat cgagtacgtt    6840

ttaatcaata tgccttatac aatcaactct ccgagccaat ttgtttactt aagttccgct    6900

tatgcagatc ctgtgcagct gatcaatctg tgtacaaatg cattgggtaa ccagtttcaa    6960

acgcaacaag ctaggacaac agtccaacag caatttgcgg atgcctggaa acctgtgcct    7020

agtatgacag tgagatttcc tgcatcggat ttctatgtgt atagatataa ttcgacgctt    7080

gatccgttga tcacggcgtt attaaatagc ttcgatacta gaaatagaat aatagaggtt    7140

gataatcaac ccgcaccgaa tactactgaa atcgttaacg cgactcagag ggtagacgat    7200

gcgactgtag ctataagggc ttcaatcaat aatttggcta atgaactggt tcgtggaact    7260

ggcatgttca atcaagcaag ctttgagact gctagtggac ttgtctggac cacaactccg    7320

gctacttagc tattgttgtg agatttccta aaataaagtc actgaagact taaaattcag    7380

ggtggctgat accaaaatca gcagtggttg ttcgtccact taaatataac gattgtcata    7440

tctggatcca acagttaaac catgtgatgg tgtatactgt ggtatggcgt aaaacaacgg    7500

aaaagtcgct gaagacttaa aattcagggt ggctgatacc aaaatcagca gtggttgttc    7560

gtccacttaa aaataacgat tgtcatatct ggatccaaca gttaaaccat gtgatggtgt    7620

atactgtggt atggcgtaaa acaacggaga ggttcgaatc ctccctaac cgcgggtagc    7680

ggccca                                                              7686
```

```
<210>  3
<211>  807
<212>  DNA
<213>  Nicotiana tabacum

<400>  3
atggctctag ttgttaaagg aaaagtgaat atcaatgagt ttatcgacct gacaaaaatg      60

gagaagatct taccgtcgat gtttacccct gtaaagagtg ttatgtgttc caaagttgat     120

aaaataatgg ttcatgagaa tgagtcattg tcaggggtga accttcttaa aggagttaag     180

cttattgata gtggatacgt ctgtttagcc ggtttggtcg tcacgggcga gtggaacttg     240

cctgacaatt gcagaggagg tgtgagcgtg tgtctggtgg acaaaaggat ggaaagagcc     300

gacgaggcca ctctcggatc ttactacaca gcagctgcaa agaaaagatt tcagttcaag     360

gtcgttccca attatgctat aaccacccag gacgcgatga aaaacgtctg gcaagtttta     420
```

Page 9

```
gttaatatta gaaatgtgaa gatgtcagcg ggtttctgtc cgctttctct ggagtttgtg    480

tcggtgtgta ttgtttatag aaataatata aaattaggtt tgagagagaa gattacaaac    540

gtgagagacg gagggcccat ggaacttaca gaagaagtcg ttgatgagtt catggaagat    600

gtccctatgt cgatcaggct tgcaaagttt cgatctcgaa ccggaaaaaa gagtgatgtc    660

cgcaaaggga aaaatagtag tagtgatcgg tcagtgccga acaagaacta tagaaatgtt    720

aaggattttg gaggaatgag ttttaaaaag aataatttaa tcgatgatga ttcggaggct    780

actgtcgccg aatcggattc gttttaa                                        807
```

```
<210>  4
<211>  807
<212>  DNA
<213>  Nicotiana tabacum

<400>  4
atggctctag ttgttaaagg aaaagtgaat atcaatgagt ttatcgacct gacaaaaatg     60

gagaagatct taccgtcgat gtttacccct gtaaagagtg ttatgtgttc caaagttgat    120

aaaataatgg ttcatgagaa tgagtcattg tcaggggtga accttcttaa aggagttaag    180

cttattgata gtggatacgt ctgtttagcc ggtttggtcg tcacgggcga gtggaacttg    240

cctgacaatt gcagaggagg tgtgagcgtg tgtctggtgg acaaaaggat ggaaagagcc    300

gacgaggcca ttctcggatc ttactacaca gcagctgcaa agaaaagatt tcagttcaag    360

gtcgttccca attatgctat aaccacccag gacgcgatga aaacgtctg gcaagtttta    420

gttaatatta gaaatgtgaa gatgtcagcg ggtttctgtc cgctttctct ggagtttgtg    480

tcggtgtgta ttgtttatag aaataatata aaattaggtt tgagagagaa gattacaaac    540

gtgagagacg gagggcccat ggaacttaca gaagaagtcg ttgatgagtt catggaagat    600

gtccctatgt cgatcaggct tgcaaagttt cgatctcgaa ccggaaaaaa gagtgatgtc    660

cgcaaaggga aaaatagtag tagtgatcgg tcagtgccga acaagaacta tagaaatgtt    720

aaggattttg gaggaatgag ttttaaaaag aataatttaa tcgatgatga ttcggaggct    780

actgtcgccg aatcggattc gttttaa                                        807
```

```
<210>  5
<211>  268
<212>  PRT
<213>  Nicotiana tabacum

<400>  5
```

Met Ala Leu Val Val Lys Gly Lys Val Asn Ile Asn Glu Phe Ile Asp
1   5   10   15

Leu Thr Lys Met Glu Lys Ile Leu Pro Ser Met Phe Thr Pro Val Lys
            20   25   30

```
Ser Val Met Cys Ser Lys Val Asp Lys Ile Met Val His Glu Asn Glu
        35                  40                  45

Ser Leu Ser Gly Val Asn Leu Leu Lys Gly Val Lys Leu Ile Asp Ser
        50                  55                  60

Gly Tyr Val Cys Leu Ala Gly Leu Val Val Thr Gly Glu Trp Asn Leu
65                  70                  75                  80

Pro Asp Asn Cys Arg Gly Gly Val Ser Val Cys Leu Val Asp Lys Arg
                85                  90                  95

Met Glu Arg Ala Asp Glu Ala Thr Leu Gly Ser Tyr Tyr Thr Ala Ala
            100                 105                 110

Ala Lys Lys Arg Phe Gln Phe Lys Val Val Pro Asn Tyr Ala Ile Thr
        115                 120                 125

Thr Gln Asp Ala Met Lys Asn Val Trp Gln Val Leu Val Asn Ile Arg
    130                 135                 140

Asn Val Lys Met Ser Ala Gly Phe Cys Pro Leu Ser Leu Glu Phe Val
145                 150                 155                 160

Ser Val Cys Ile Val Tyr Arg Asn Asn Ile Lys Leu Gly Leu Arg Glu
                165                 170                 175

Lys Ile Thr Asn Val Arg Asp Gly Gly Pro Met Glu Leu Thr Glu Glu
            180                 185                 190

Val Val Asp Glu Phe Met Glu Asp Val Pro Met Ser Ile Arg Leu Ala
        195                 200                 205

Lys Phe Arg Ser Arg Thr Gly Lys Lys Ser Asp Val Arg Lys Gly Lys
    210                 215                 220

Asn Ser Ser Ser Asp Arg Ser Val Pro Asn Lys Asn Tyr Arg Asn Val
225                 230                 235                 240

Lys Asp Phe Gly Gly Met Ser Phe Lys Lys Asn Asn Leu Ile Asp Asp
                245                 250                 255

Asp Ser Glu Ala Thr Val Ala Glu Ser Asp Ser Phe
            260                 265
```

<210> 6

<211> 268
<212> PRT
<213> Nicotiana tabacum

<400> 6

Met Ala Leu Val Val Lys Gly Lys Val Asn Ile Asn Glu Phe Ile Asp
1   5   10   15

Leu Thr Lys Met Glu Lys Ile Leu Pro Ser Met Glu Thr Pro Val Lys
            20   25   30

Ser Val Met Cys Ser Lys Val Asp Lys Ile Met Val His Glu Asn Glu
        35   40   45

Ser Leu Ser Gly Val Asn Leu Leu Lys Gly Val Lys Leu Ile Asp Ser
    50   55   60

Gly Tyr Val Cys Leu Ala Gly Leu Val Val Thr Gly Glu Trp Asn Leu
65   70   75   80

Pro Asp Asn Cys Arg Gly Gly Val Ser Val Cys Leu Val Asp Lys Arg
                85   90   95

Met Glu Arg Ala Asp Glu Ala Ile Leu Gly Ser Tyr Tyr Thr Ala Ala
            100   105   110

Ala Lys Lys Arg Phe Gln Phe Lys Val Val Pro Asn Tyr Ala Ile Thr
        115   120   125

Thr Gln Asp Ala Met Arg Asn Val Trp Gln Val Leu Val Asn Ile Arg
    130   135   140

Asn Val Lys Met Ser Ala Gly Phe Cys Pro Leu Ser Leu Glu Phe Val
145   150   155   160

Ser Val Cys Ile Val Tyr Arg Asn Asn Ile Lys Leu Gly Leu Arg Glu
                165   170   175

Lys Ile Thr Asn Val Arg Asp Gly Gly Pro Met Glu Leu Thr Glu Glu
            180   185   190

Val Val Asp Glu Phe Met Glu Asp Val Pro Met Ser Ile Arg Leu Ala
        195   200   205

Lys Phe Arg Ser Arg Thr Gly Lys Lys Ser Asp Val Arg Lys Gly Lys
    210   215   220

Asn Ser Ser Ser Asp Arg Ser Val Pro Asn Lys Asn Tyr Arg Asn Val

225   230   235   240

Lys Asp Phe Gly Gly Met Ser Phe Lys Lys Asn Asn Leu Ile Asp Asp
                245   250   255

Asp Ser Glu Ala Thr Val Ala Glu Ser Asp Ser Phe
            260   265